

IN THE CLAIMS:

Claim 1 (Currently Amended): A method for manufacturing a built-up printed circuit board with stack type via-holes, comprising the steps of:

(a) forming a first via-hole through a first copper layer of a first laminated copper sheet by means of a laser drill to expose a second copper layer of the first laminated copper sheet;

(b) forming a first plated layer on the first via-hole and on the first laminated copper sheet;

(c) filling the first plated via-hole with a via-hole filling material;

(d) grinding the top surface of the first via-hole filled with the via-hole filling material to level the first via-hole;

(e) forming a second plated layer on the first filled via-hole and the first plated layer to cover the first filled via-hole; and

(f) disposing a second laminated copper sheet on the second plated layer, and repeating the steps (a) to (e) to form a second via-hole.

Claim 2 (Original): The method as set forth in claim 1, wherein the laser is a CO₂ laser or an Nd-YAG laser.

Claim 3 (Original): The method as set forth in claim 1, wherein the first and second plated layers are formed by means of P/N plating (CAP plating).

Claim 4 (Original): The method as set form in claim 1, wherein the via-hole filling material is filled in the via-hole by a general screen printing process.

Claim 5 (Original): The method as set forth in claim 4, wherein a portion of a poly screen corresponding to the via-hole is opened so that the via-hole filling material passes through the opened portion to fill only the via-hole during the screen printing.

Claim 6 (Original): The method as set forth in claim 1, wherein the via-hole filling material is liquefied insulating resin.

Claim 7 (Original): The method as set forth in claim 1, wherein the via-hole filling material is conductive paste.

Claim 8 (Original): The method as set forth in claim 7, wherein the conductive paste is copper paste or silver paste.

Claim 9 (Original): The method as set forth in claim 1, wherein a viscosity of the via-hole filling material is not more than 100 dPa.s.

Claim 10 (Original): The method as set forth in claim 1, wherein the grinding step is carried out by a grinder made of ceramic buff, scotch buff, highcut buff, or belt.

Claim 11 (Withdrawn): A method for manufacturing a built-up printed circuit board with stack type via-holes, comprising the steps of:

- (a) forming a first via-hole through a first laminated copper sheet by means of a laser drill;
- (b) forming a first plated layer on the first via-hole and on the first laminated copper sheet;
- (c) filling the first plated via-hole with a via-hole filling material;
- (d) grinding the tope surface of the first via-hole filled with the via-hole filling material to level the first via-hole;
- (e) forming a second plated layer on the first leveled via-hole and the first laminated copper sheet to cover the first leveled via-hole;
- (f) disposing a second laminated copper sheet on the second plated layer,
- (g) forming a second via-hole through the second laminated copper sheet by means of the laser drill;
- (h) filling the second via-hole with another via-hole filling material;
- (i) grinding the top surface of the second via-hole filled with the via-hole filling material to level the second via-hole; and

(j) forming a third plated layer on the second leveled via-hole and the second laminated copper sheet to cover the second leveled via-hole, and forming a circuit pattern on the third plated layer.

Claim 12 (Withdrawn): The method as set forth in claim 11, wherein a viscosity of the via-hole filling material is not more than 100 dPa.s.

Claim 13 (Withdrawn): The method as set forth in claim 11, wherein the filling step of filling the via-hole with the via-hole filling material is carried out using a general screen printing machine.

Claim 14 (Withdrawn): The method as set forth in claim 13, wherein the screen printing machine has a screen of not more than 250 mesh of a poly or stainless steel (SUS) sheet.

Claim 15 (Withdrawn): The method as set forth in claim 13, wherein the screen printing machine has a rubber squeegee spreading speed of not more than 150 mm/sec.

Claim 16 (Withdrawn): The method as set forth in claim 11, further comprising:
firstly drying the printed circuit board at a low temperature of 60 to 80 °C for 15 to 30 minutes; and

secondly drying the printed circuit board at a high temperature of 140 to 160 °C for 30 to 60 minutes,

wherein the first and second drying steps are carried out after the filling step of filling the via-hole with the via-hole filling material.

Claim 17 (Withdrawn): The method as set forth in claim 11, wherein the via-hole formed by the laser drill has a diameter of 50 μm to 200 μm .

Claim 18 (Withdrawn): A built-up printed circuit board with stack type via-holes, comprising:

- a plurality of first via-holes formed through a first laminated copper sheet by means of a laser drill;
- a first plated layer formed on the first via-holes and the first laminated copper sheet;
- a filling material filled in each of the first plated via-holes;
- a second plated layer formed on the first filled via-holes and the first plated layer to cover the first filled via-holes;
- a plurality of second laminated copper sheets disposed on the second plated layer, respectively; and
- a plurality of second via-holes formed through the second laminated copper sheets by means of the laser drill.

Claim 19 (Withdrawn): The board as set forth in claim 18, wherein the laser is a CO₂ laser or an Nd-YAG laser.

Claim 20 (Withdrawn): The board as set forth in claim 18, wherein the first and second plated layers are formed by means of P/N plating (CAP plating).

Claim 21 (Withdrawn): The board as set forth in claim 18, wherein the via-hole filling material is filled in each of the via-hole by a general screen printing process.

Claim 22 (Withdrawn): The board as set forth in claim 21, wherein portions of a poly screen corresponding to the via-holes are opened so that the via-hole filling material passes through each of the opened portions to fill only the via-holes during the screen printing.

Claim 23 (Withdrawn): The board as set forth in claim 18, wherein the via-hole filling material is liquefied insulating resin.

Claim 24 (Withdrawn): The board as set forth in claim 18, wherein the via-hole filling material is conductive paste.

Claim 25 (Withdrawn): The board as set forth in claim 24, wherein the conductive paste is copper paste or silver paste.